REQUEST FOR RECONSIDERATION

Claims 1-13 and 15-20 remain active in this application.

The claimed invention is directed to a process for preparing a readily water-redispersable polymer powder and polymer powder prepared by said method.

Applicants wish to thank examiner Kwak and Supervisory Patent Examiner Eashoo for the helpful and courteous discussion held with their U.S. representative on June 10, 2009. At that time, applicants' U.S. representative argued that spray drying of an aqueous polymer dispersion with a spray assistant was a distinct process from tanning of animal hide with a tanning agent as spray drying is performed on an aqueous dispersion while tanning is performed on animal hide. The distinct acts do not allow for concurrent action as a spray assistant and the tanning agent. The following is intended to expand upon the discussion with the examiners.

Aqueous dispersions of polymer particles have many commercial uses. In view of the high water content, transport of such aqueous polymer dispersions can suffer an economic detriment in terms of transportation costs. Efforts to prepare spray dried polymer powders, which can be transported more cost effectively, have experienced some difficulties with redispersion such that process for the preparation of polymer powders which are readily water-dispersible are still sought.

The claimed invention addresses the problem by providing a process for preparing a readily water-dispersible polymer powder **by spray drying an aqueous polymer dispersion** in the presence of a spray assistant A which is **the reaction product** of a dihydroxydiphenyl sulfone, an aliphatic aldehyde and sodium sulfide. Applicants have discovered that such a reaction product is an effective spray assistant for providing a readily water-redispersible polymer powder. Such a process is nowhere disclosed or suggested in the cited references of record.

The rejections of claims 1-6 under 35 U.S.C. § 103(a) over Weiser et al. (U.S. 5,342,916) in view of Pabst et al. (WO 03/016578) as evidenced by U.S. 6,881,356 as well as the rejection of claims 7-10, 12 and 20 under 35 U.S.C. § 103(a) over Weiser et al. in view of Pabst et al. as applied above in further view of Weitzel et al. (U.S. 6,127,483), of claims 1, 11 and 13 under 35 U.S.C. § 103 over Weitzel et al in view of Pabst et al. and of claims 15-17 and 18-19 under 35 U.S.C. § 103(a) over Weitzel et al. in view of Pabst et al. and in further view of Sandor et al. are respectfully traversed.

None of the cited references disclose or suggest a spray drying process of an aqueous polymer dispersion in which the spray assistant is the reaction product of a dihydroxydiphenyl sulfone, an aliphatic aldehyde and sodium sulfide.

Applicants note that in a spray drying process of **an aqueous polymer dispersion**, dispersed polymer particles are separated from the aqueous suspending medium in the presence of a spray assistant. The resulting product is a dry polymer powder which also contains a spray assistant.

A spray drying process is fundamentally distinct from a leather tanning process in which animal hide (e.g. cattlehide) is treated with a liquid containing a tanning agent (see example 6 of Weiser et al). Tanning leather involves a process which permanently alters the **protein structure** of skin so that it can not ever return to rawhide. Thus, tanning is the reaction of a tanning agent on protein materials. A spray assistant is the action of a spray assistant on a dispersion of water-insoluble polymer particles.

Thus, when spray drying is conducted, an aqueous polymer dispersion is acted on wherein when leather tanning is conducted an animal hide is acted upon. There is no animal hide present during spray drying of an aqueous polymer dispersion and there is no aqueous polymer dispersion being spray dried during a leather tanning process.

As such, even though Weiser et al. describes a composition which has separate functions as a spray assistant and as a leather tanning agent, the function of a spray assistant is only realized during a spray drying process while the function of a leather tanning agent are only realized during contact with animal hide.

Weiser et al. describes a spraying aid using a condensation polymer of sulfonated phenols, urea, other organic nitrogen-bases and formaldehyde (see Abstract). The condensation polymer is identified as also being well-suited for use in a separate process as a tanning agent (column 4, lines 1-3). There is no disclosure of using a spray assistant obtained by reacting a dihydroxydiphenyl sulfone, an aliphatic aldehyde and sodium sulfide in a spray drying process.

The basic deficiencies of the primary reference are not cured by the secondary reference of Pabst et al.

Pabst et al. describes a process for preparing a sulfone-containing **tanning material** comprising a component (A) prepared by a) reacting phenol with constituted sulfuric acid, with oleum or a mixture thereof to form a mixture containing phenolsulfonic acid, dihydroxydiphenyl sulfone and sulfuric acid followed by condensation with an aliphatic aldehyde, and a component (B) obtained by reacting a dihydroxydiphenyl sulfone with an aliphatic aldehyde and sodium sulfide. In a tanning process the composition is acted on an animal hide. The composition is not described as suitable for a spray drying material but rather only as a tanning agent. Thus, there would have been no motivation to uses such a material in a spray drying method.

Applicants respectfully submit that it would not have been obvious to have used the tanning material of Pabst et al. in a spray drying process of an aqueous polymer dispersion as the tanning material of Pabst et al. is not sufficiently similar to known spray drying assistants.

Page 3 of the official action asserts that "a person having ordinary skill in the art would have found it obvious to substitute solutions "spray assistant A" of Pabst et al into the process of spraying the polymer powder taught by Weiser et al. and would have motivated to so for such desirable properties to tanning materials with a good tanning effect and good penetration that would provide leathers having good fastness, softness and fullness." As discussed above, when uses as a spray assistant, the composition provides no tanning effect as there is no animal hide present to be subject to leather tanning.

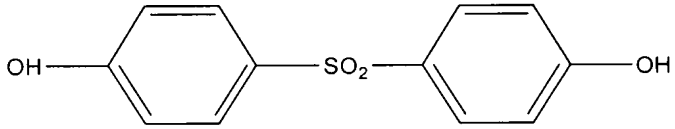
Weitzel et al. (U.S. 6,127,483) describes a known spray auxiliaries as **naphthalene**sulfonic acid-formaldehyde or **benzene**sulfonic acid-formaldehyde condensation products. Such sulfonated **aromatic acids** are structurally different from the reaction product of a dihydroxydiphenyl sulfone with an aliphatic acid and sodium sulfite. As such, those of ordinary skill in the art would not be motivated to use such a dihydroxydiphenyl sulfone/aliphatic aldehyde reaction product in a spray drying method based on the prior disclosures of naphthalenesulfonic acid-formaldehyde and benzenesulfonic acid-formaldehyde spray auxiliaries.

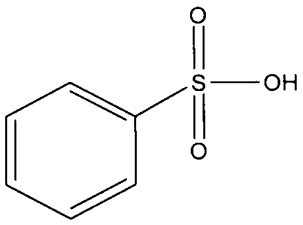
Page 5 of the official action asserts that "a person having ordinary skill in art would have been found it obvious to substitute the component B solution into the process of spraying the polymer powder taught by Weitzel et al. and would have been motivated to so for such desirable properties to improve polymers that can be easily re-dispersed in water and in a spray drying application used in building industry."

This argument is erroneous as Pabst et al. provides no suggestion that there would be spray assistance properties when spray drying an aqueous polymer dispersion. Furthermore the differences in structure between the compositions of Weitzel et al. and Pabst et al. would provide no expectation of spray assistance properties for the composition of Pabst et al. There is no evidence of record to provide any expectation that the Pabst et al. composition

would function as a spray assistant. Therefore, there can be expectation to improve the re-dispersability of a polymer powder using the known tanning material of Pabst et al.

Page 7 of the official action asserts that a dihydroxydiphenyl sulfone is an aromatic sulfonic acid structure. However, there is **no** sulfonic **acid** in a dihydroxydiphenyl **sulfone** and for at least this reason a dihydroxydiphenyl sulfone is not suggestive of an aromatic sulfonic acid structure. The structures of dihydroxydiphenyl **sulfone** and an aromatic sulfonic acid are, illustrated below:





There is no acidic proton in a sulfone such that a sulfone is not suggestive of a sulfonic acid.

While the examiner cites to the condensation polymer of Weiser et al. as both a spray assistant and tanning agent (column 1, lines 9-16) as motivation for using the known tanning material of Pabst et al. in a spray drying method, the unique structures of Weiser et al. which may be used as both a spray drying aid and a tanning agent does not create an expectation that all tanning agents would be expected to behave as spray drying assistants. As previously noted, known spray drying assistants have an aromatic sulfonic acid structure, which is not found in the product of Pabst et al. such that there would be no motivation to use such a reaction product in a spray drying method. For this reason, the claimed invention would not have been obvious and accordingly withdrawal of the rejection under 35 U.S.C. § 103(a) is respectfully requested.

Not only would it not have been obvious to use the tanning agent of Pabst et al. in a polymer powder spray drying method, but there would have been no expectation of improved whiteness for a polymer powder dispersed with a spray drying assistant as claimed. The examiner's attention is directed to table 1 appearing on pages 15-16 of applicants' specification. Powders P1 and P2 were prepared using a spray assistant as claimed and is based on the reaction product of dihydroxydiphenyl sulfone, formaldehyde and sodium sulfite. Powders PV1 and PV2 were prepared using spray assistants based on the reaction product of a sulfonated naphthalene with formaldehyde (SV2) and the reaction product of a sulfonated phenol with formaldehyde (SV3). For the examiner's convenience the data from table 1 is reproduced below.

Powder	Dispersion	Spray assistant	Yield [% by wt.]	Color	Redispersibility	Yellowing of the film
P1	D1	S1	82	white	good	1-2
P2	D2	S1	83	white	good	1-2
PV1	D1	SV2	84	yellow	good	4
PV2	D1	SV3	83	brown	good	5

Powders PV1 and PV2, prepared using spray assistants based on sulfonated naphthalene (SV2) and sulfonated phenol (SV3) respectively, while exhibiting good redispersibility, also exhibited a **pronounced coloration** as well as a **detectable yellowing** for polymer films formed there from.

In contrast, powders P1 and P2, prepared using a spray assistant as claimed based on dihydroxydiphenyl sulfone, exhibited good redispersibility but exhibited **no pronounced coloration** (white) and significantly **less yellowing** for polymer films formed there from. Thus, even if it were obvious to have used the tanning agent of Pabst et al. as a spray drying aide, there would have been no expectation of improved properties from a polymer powder prepared using such a spray assistant. Thus, applicants have discovered an improved result from the combination as claimed.

Claims 1-13 and 15-20 would not have been obvious under 35 U.S.C. § 103(a) over Weiser et al. in view of Pabst et al. and in further view of Weitzel et al. and accordingly withdrawal of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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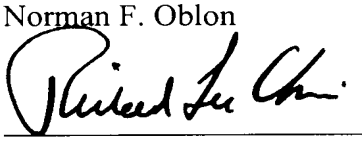

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